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THE PARTIES

2. Brazos is a limited liability corporation organized and existing under the laws of Delaware, with its principal place of business at 606 Austin Ave, Ste 6, Waco, TX 76701.

3. On information and belief, Defendant Huawei Investment & Holding Co., Ltd. is a Chinese corporation that does business in Texas, directly or through intermediaries, with a principal place of business at Bantian, Longgang District, Shenzhen, 518129, People's Republic of China.

4. On information and belief, Defendant Huawei Technologies Co., Ltd. is a Chinese corporation that does business in Texas, directly or through intermediaries, with a principal place of business at Bantian, Longgang District, Shenzhen 518129, People's Republic of China.

5. Upon information and belief, Defendant Huawei Technologies USA Inc. is a corporation organized and existing under the laws of Texas that maintains an established place of business at 2391 NE Interstate 410 Loop, San Antonio, TX 78217. Huawei Technologies USA, Inc. is authorized to do business in Texas and may be served via its registered agent, CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201-3136.

6. Upon information and belief, Defendant Huawei Device Co. Ltd. (formerly known as Huawei Device (Dongguan) Co.) is a Chinese corporation that does business in Texas, directly or through intermediaries, and maintains a principal place of business in No.2 of Xincheng Road, Songshan Lake Zone, Dongguan, Guangdong 523808, People's Republic of China.

7. Upon information and belief, Huawei Device (Shenzhen) Co., Ltd. (formerly known as Huawei Device Co., Ltd.) is a wholly-owned subsidiary of Defendant Huawei

Device Co. Ltd. is a Chinese corporation that does business in Texas, directly or through intermediaries, and maintains a principal place of business in Bantian, Longgang District, Shenzhen 518129, People's Republic of China.

8. On information and belief, Defendant Huawei Device USA, Inc., is a Texas corporation with a principal place of business located at 5700 Tennyson Parkway, Suite 600, Plano, Texas 75024. Huawei Device USA, Inc. is authorized to do business in Texas and may be served via its registered agent, CT Corporation System, 1999 Bryan Street, Suite 900, Dallas, Texas 75201-3136.

9. All of the Defendants operate under and identify with the trade name "Huawei." Each of the Defendants may be referred to individually as a "Huawei Defendant" and, collectively, Defendants may be referred to below as "Huawei" or as the "Huawei Defendants." Upon information and belief, Defendant Huawei Investment & Holding Co., Ltd. provides consolidated financial reporting for Huawei entities, including all Huawei Defendants.

JURISDICTION AND VENUE

10. This is an action for patent infringement which arises under the Patent Laws of the United States, in particular, 35 U.S.C. §§271, 281, 284, and 285.

11. This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331 and 1338(a).

12. This Court has specific and general personal jurisdiction over each Huawei Defendant pursuant to due process and/or the Texas Long Arm Statute, because each Huawei Defendant has committed acts giving rise to this action within Texas and within this judicial district. The Court's exercise of jurisdiction over each Huawei Defendant would not offend traditional notions of fair play and substantial justice because Huawei has established

minimum contacts with the forum. For example, on information and belief, Huawei Defendants have committed acts of infringement in this judicial district, by among other things, selling and offering for sale products that infringe the asserted patent, directly or through intermediaries, as alleged herein.

13. Venue in the Western District of Texas is proper pursuant to 28 U.S.C. §§1391 and 1400(b) because Huawei Technologies USA Inc. and Huawei Device USA Inc. have committed acts of infringement in this judicial district and have a regular and established places of business in this judicial district and in Texas. As non-limiting examples, on information and belief, Huawei Technologies USA Inc. and Huawei Device USA Inc. have sold or offered to sell the Accused Products in this judicial district and have employees or agents that operate Huawei equipment in this judicial district, including at 189 CR 265, Georgetown, TX 78626, 1150 S Bell Blvd, Cedar Park, TX 78613, 1399 S A W Grimes Blvd, Round Rock, TX 78664, 12335 IH 35, Jarrell, TX 76537, 1050 Rabbit Hill Rd, Unit #E, Georgetown, TX 78626, 1602 A W Grimes Blvd, Round Rock, TX 78664, 4120 IH 35 N, Georgetown, TX 78626, 900 CR 272, Leander, TX 78641, 1950 Crystal Falls Pkwy, Leander, TX 78641, 1101 N Industrial Blvd, Round Rock, TX 78681, 506 McNeil Rd, Round Rock, TX 78681, 3210 Chisholm Trail Rd, Round Rock, TX 78681, 112 Roundville Ln, Round Rock, TX 78664, 202 Central Dr W, Georgetown, TX 78628, 3595 E Hwy 29, Georgetown, TX 78626, 1402 W Welch St, Taylor, TX 76574, 3801 Oak Ridge Dr, Round Rock, TX 78681, 1957 Red Bud Ln #B, Round Rock, TX 78664, 6603 S Lakewood Dr, Georgetown, TX 78633, 500 W Front, Hutto, TX 78634.

COUNT ONE - INFRINGEMENT OF
U.S. PATENT NO. 6,999,727

14. Brazos re-alleges and incorporates by reference the preceding paragraphs of this Complaint.

15. On February 14, 2006, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 6,999,727 (“the ’727 Patent”), entitled “Method to Implement A Performance Monitoring Function On The Ground Of The Retrieved Data Through Fec (Forward Error Correction) In A Telecom Network.” A true and correct copy of the ’727 Patent is attached as Exhibit A to this Complaint.

16. Brazos is the owner of all rights, title, and interest in and to the ’727 Patent, including the right to assert all causes of action arising under the ’727 Patent and the right to any remedies for the infringement of the ’727 Patent.

17. Huawei makes, uses, sells, offers for sale, imports, and/or distributes in the United States, including within this judicial district, products such as, but not limited to, Huawei optical transmission equipment that supports a variety of access modes (collectively, the “Accused Products”).

18. The Accused Products include Huawei OptiX OSN 7500/6800/8800/3800 series.

19. Huawei OptiX OSN 7500 (including OSN 6800/8800/3800 series) is a new generation optical transmission equipment that supports a variety of access modes. OSN 7500 adopts unified switching architecture, i.e., both time-division multiplexing (TDM) domain, and the packet domain. OSN 7500 mainly applies to service scheduling nodes at the backbone layer of MANs to schedule and transmit services of different types and granularities.

OSN 7500

OSN 7500 is a new-generation optical transmission system developed by Huawei based on the current applications and development trend of MANs. It is an optical core switching (OCS) device applied to service scheduling nodes at the backbone layer of MANs to schedule and transmit services of different types and granularities.



OSN 7500 adopts a unified switching architecture and can function as an MPLS/MPLS-TP-based packet device or a TDM device. When working with other devices of Huawei, OSN 7500 supports various networking modes, including the pure packet mode, hybrid networking (packet + TDM) mode, and pure TDM mode, achieving optimal processing for packet services and traditional SDH services.

<https://carrier.huawei.com/en/products/fixed-network/transmission/hybrid-mstp/osn7500>

20. OSN 7500/8800/6800/3800 series router switches support the forward error correction technology which is implemented to rectify the errors produced during signal transmission.

The equipment supports a built-in WDM technology, which enables the transmission of several wavelengths in one fiber.

The equipment supports the forward error correction (FEC) technology, which can correct the errors generated during signal transmission and therefore improve the tolerance of signal-to-noise ratio at the receive end and extend the length of relay sections.

[https://www.karma-group.ru/upload/iblock/a86/OptiX%20OSN%207500%20II%20Product%20Overview\(Hybrid\).pdf](https://www.karma-group.ru/upload/iblock/a86/OptiX%20OSN%207500%20II%20Product%20Overview(Hybrid).pdf),

OptiX OSN 8800/6800/3800

Supports forward error correction (FEC) that complies with ITU-T G.975.

<https://www.scribd.com/document/216325471/OSN-6800-pdf>

21. OSN 7500 uses Transport Packet assist (TP-assist) that enables care-free maintenance solutions for packet transport networks based on the MPLS/MPLS-TP architecture. OSN 7500 provides a planning tool for PTNs. OSN 7500 supports automatic fault location & performance monitoring of packet services. Performance Monitoring events evaluate the quality of the path (or link) used for data transfer.

TP-assist, care-free maintenance

The TP-assist implements care-free maintenance solutions for packet transport networks (PTNs) based on the MPLS/MPLS-TP architecture. The OSN 7500 provides a planning tool for PTNs, which enables end-to-end visible service configuration of media gateways and instrument-free site deployment. Moreover, the OSN 7500 supports automatic fault locating and performance monitoring of packet services.

<https://carrier.huawei.com/en/products/fixed-network/transmission/hybrid-mstp/osn7500>,

Ethernet port OAM (EFM) helps maintain point-to-point Ethernet links between two directly-connected devices, and it is not service-specific. Ethernet port OAM provides the following functions:

- OAM auto-discovery
- Link performance monitoring
- Fault detection
- Remote loopback
- Self-loop detection

[https://www.karma-group.ru/upload/iblock/a86/OptiX%20OSN%207500%20II%20Product%20Overview\(Hybrid\).pdf](https://www.karma-group.ru/upload/iblock/a86/OptiX%20OSN%207500%20II%20Product%20Overview(Hybrid).pdf)

22. The performance monitoring function further stores the results of performance tests performed in 15-min and 24 hrs durations.

The OptiX OSN equipment can monitor and report various performance events to help users monitor and manage the equipment.

For 15-minute performance monitoring, the equipment can store a maximum of 16x15-minute historical performance data, namely, performance data over 4 hours and 15 minutes. For 24-hour performance monitoring, the equipment can store a maximum of 6x24-hour historical performance data, namely, performance data over 6 days and 24 hours.

[https://www.karma-group.ru/upload/iblock/a86/OptiX%20OSN%207500%20II%20Product%20Overview\(Hybrid\).pdf](https://www.karmagroup.ru/upload/iblock/a86/OptiX%20OSN%207500%20II%20Product%20Overview(Hybrid).pdf)

23. OSN 7500 series supports built-in WDM technology, which enables transmissions of several wavelengths in one fiber. OSN 7500 supports Forward Error Correction (FEC) technology. Huawei OptiX OSN 7500 uses Forward Error Correction (FEC) functions to rectify the bit errors occurring in blocks.

The equipment supports a built-in WDM technology, which enables the transmission of several wavelengths in one fiber.

The equipment supports the forward error correction (FEC) technology, which can correct the errors generated during signal transmission and therefore improve the tolerance of signal-to-noise ratio at the receive end and extend the length of relay sections.

[https://www.karmagroup.ru/upload/iblock/a86/OptiX%20OSN%207500%20II%20Product%20Overview\(Hybrid\).pdf](https://www.karmagroup.ru/upload/iblock/a86/OptiX%20OSN%207500%20II%20Product%20Overview(Hybrid).pdf)

24. FEC relates to encoding the information transmitted in the form of fixed-sized blocks of data. OSN 7500 performs FEC function once the blocks of data are received.

FEC is a coding technology widely used in communication systems. Using a classical block code as an example, the FEC encoder at the transmit end uses kilo bits of information as a block code.

https://www.huawei.com/ilink/en/download/HW_140702

Huawei's 100G soft-decision FEC scheme has the following characteristics:	
Higher coding gain and integration alongside lower power consumption.	
100% soft-decision decoding without using concatenated hard-decision FEC codes, greatly reducing transmission latency.	
Unique architecture, implemented by cascaded pipelines, greatly reduces complexity when soft decision decoding.	
Innovative soft decision architecture, which is scalable and flexible to provide different power consumption specifications and performances.	
Twenty percent or higher overhead, together with spectrum compression at the transmit end, which reduces the transmission penalty caused by rate increases at the transmit end and ensures the desired coding gain for high overhead soft-decision FEC.	
Soft decision combined with Huawei's unique DSP technique provides differentiated system solutions.	

https://www.huawei.com/ilink/en/download/HW_140702

25. The accused product obtains data related to the number of blocks that are corrected and uncorrected after implementation of the Forward Error Correction.

FEC_COR_0BIT_CNT	FEC corrected 0 bit count
FEC_COR_1BIT_CNT	FEC corrected 1 bit count
FEC_COR_BYTE_CNT	FEC corrected byte count
FEC_UNCOR_BLOCK_CNT	FEC uncorrected frames

<https://support.huawei.com/enterprise/my/doc/EDOC1000178036/ee1cd5a6/fec-service-performance-event-list>,

3. Count of frames that cannot be corrected: fec_uncor_block_cnt. Usually, frames that cannot be corrected are present when bit errors in the line exceed the correction limit of the FEC or burst bit errors occur in the case of a fiber cut or large signal fluctuation. Normally, the value of fec_aft_cor_er is 0. In the case of 15-minute and 24-hour performance monitoring, this performance event does not exist.

4. The count of corrected "0" bits plus the count of correct "1" bits equal the count of corrected bytes.

Source: <https://support.huawei.com/enterprise/en/knowledge/KB0000358626>

26. Huawei OptiX OSN 7500 uses the Forward Error Correction function to correct block of information. If a block is corrected with the FEC mechanism, it is classified as a corrected block otherwise as an uncorrected block.

forward error correction (FEC)	A bit error correction technology that adds correction information to the payload at the transmit end. Based on the correction information, the bit errors generated during transmission can be corrected at the receive end.
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https://support.huawei.com/view/contentview/getFileStream?mid=SUPE_DOC&viewNid=EDOC0100507779&nid=EDOC0100507779&partNo=j008&type=htm#dd-f

After the codeword is transmitted to the receive end over a channel, the FEC decoder detects and corrects bit errors during decoding – if the errors are within the correction range.

https://www.huawei.com/ilink/en/download/HW_140702

27. With the help of in-built functions, OSN 7500 can detect (i.e. classify) and count corrected and uncorrected blocks.

FEC_UNCOR_BLOCK_CNT

Description

Forward Error Correction - uncorrected Block Count

https://support.huawei.com/enterprise/en/doc/EDOC1000178036/84e283e8/fec_uncor_block_cnt

FEC_COR_0BIT_CNT	FEC corrected 0 bit count
FEC_COR_1BIT_CNT	FEC corrected 1 bit count
FEC_COR_BYTE_CNT	FEC corrected byte count
FEC_UNCOR_BLOCK_CNT	FEC uncorrected frames

<https://support.huawei.com/enterprise/my/doc/EDOC1000178036/ee1cd5a6/fec-service-performance-event-list>

28. Huawei OptiX OSN 7500 provides various performance parameters/ events such as Severely Errored Second - SES (i.e., SCS) and Background Block Error - BBE (i.e., BCE). Severely Errored Second (SES) indicates the time period in which more than 30% of

errored block occur (i.e. at least an uncorrected block has been detected). Background Block Error (BBE), represents the number of errored blocks which are detected outside the SES time period.

3.1 error performance events: In the following definitions, this Recommendation neither assumes nor requires that forward error correction (FEC) is used (see [ITU-T G.709]). However, if FEC is used, all the performance parameters and events are defined after FEC (i.e., post-FEC). In other words, the detection of the performance events (e.g., BBE, SES) is after any error correction.

https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-G.8201-201104-I!!PDF-E&type=items

SES	Severely errored second. It indicates a certain second, which contains more than 30% errored blocks or at least one serious disturbance period (SDP). The SDP is a period of at least four consecutive blocks or 1 ms (taking the longer one) where the error ratios of all the consecutive blocks are more than or equal to 10^{-2} or a loss of signal occurs.
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<https://support.huawei.com/enterprise/br/doc/EDOC1000178036/2181ad28>

BBE	Background block error. It indicates an errored block occurring outside the period of UAT and SES.
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<https://support.huawei.com/enterprise/br/doc/EDOC1000178036/2181ad28>

29. There are errors that occur before the implementation of FEC or any correction scheme. FEC corrects the errors that are within its capacity or range.

This command is used to retrieve the pre-FEC and post-FEC BERs.

https://support.huawei.com/view/contentview!getFileStream.action?mid=SUPE_DOC&viewNid=EDOC1000053910&nid=EDOC1000053910&partNo=j002&type=htm

After the codeword is transmitted to the receive end over a channel, the FEC decoder detects and corrects bit errors during decoding – if the errors are within the correction range.

https://www.huawei.com/ilink/en/download/HW_140702

30. After the implementation of FEC, the errored blocks within the correction capacity of FEC are corrected. The number of errored blocks which are beyond the correction capacity of FEC remain uncorrected. Amongst these uncorrected blocks, the blocks lying outside the time period SES (or non-SES) are referred as Background Block Error (BBE).

BBE	Background block error. It indicates an errored block occurring outside the period of UAT and SES.
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<https://support.huawei.com/enterprise/br/doc/EDOC1000178036/2181ad28>

31. The accused product Huawei OptiX OSN 7500 provides the method of calculating the Background Block Error Ratio (BBER) (i.e. Performance Monitoring Function) by correlating the information between the corrected and uncorrected blocks obtained through the FEC function. The correlation of the corrected and uncorrected blocks information comprises performance events explained above (Severely Errored Second - SES and Background Block Error – BBE).

3.2.2 background block error ratio (BBER): The ratio of BBE in available time to total blocks in available time during a fixed measurement interval. The count of total blocks excludes all blocks during SESs.

https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-G.8201-201104-I!!PDF-E&type=items.

32. Background Block Error Ratio (BBER) is the ratio of BBE in available time (during a fixed measurement interval) to total number of blocks excluding the blocks from the SES period.

6.32 ETH_BBER

Description

40GE/100GE ratio of background block error.

40GE/100GE section background block errors are detected by checking the received parity bits. The background block error refers to a data block where at least one bit error is generated during the transmission. Background block error ratio of the 40GE/100GE refers to the ratio of the number of background block errors of the 40GE/100GE to the number of all blocks minus the number of blocks during the unavailable time and SES period. $BBER = BBE / (BBE - UAS - SES)$

<https://support.huawei.com/enterprise/en/doc/EDOC1000079082?section=j009>

Table 11-31 Performance events in the PM section		
Abbreviation	Description	Unit
ODU0_PM_BBE	PM section background errored block for ODU0 services	Blocks
ODU0_PM_BBER	PM section background block error ratio for ODU0 services	%

<https://support.huawei.com/enterprise/en/doc/EDOC1000178036/8c644a29/otn-performance-events>

33. The number of errored blocks, lying in the non-SES period, which are left uncorrected (or uncorrected errors) after the implementation of FEC are dependent upon the number of blocks corrected by FEC in the non-SES time period. Therefore, the number of corrected and uncorrected blocks are correlated in the BBER ratio through the parameters BBE and SES respectively.

34. In view of preceding paragraphs, each and every element of at least claim 1 of the '727 Patent is found in the Accused Products.

35. Huawei has and continues to directly infringe at least one claim of the '727 Patent, literally or under the doctrine of equivalents, by making, using, selling, offering for sale, importing, and/or distributing the Accused Products in the United States, including within this judicial district, without the authority of Brazos.

36. Huawei has received notice and actual or constructive knowledge of the '727 Patent since at least the date of service of this Complaint.

37. Since at least the date of service of this Complaint, through its actions, Huawei has actively induced product makers, distributors, retailers, and/or end users of the Accused Products to infringe the '727 Patent throughout the United States, including within this judicial district, by, among other things, advertising and promoting the use of the Accused Products in various websites, including providing and disseminating product descriptions, operating manuals, and other instructions on how to implement and configure the Accused Products. Examples of such advertising, promoting, and/or instructing include the documents at:

- <https://carrier.huawei.com/en/products/fixed-network/transmission/hybrid-mstp/osn7500>
- <https://www.scribd.com/document/216325471/OSN-6800-pdf>
- https://www.huawei.com/ilink/en/download/HW_140702
- <https://support.huawei.com/enterprise/en/knowledge/KB0000358626>
- https://www.itu.int/rec/dologin_pub.asp?lang=e&id=T-REC-G.8201-201104-I!!PDF-E&type=items
- <https://support.huawei.com/enterprise/br/doc/EDOC1000178036/2181ad28>
- https://support.huawei.com/view/contentview/getFileStream?mid=SUPE_DOC&viewNid=EDOC0100507779&nid=EDOC0100507779&partNo=j008&type=htm#dd-f
- [https://www.karma-group.ru/upload/iblock/a86/OptiX%20OSN%207500%20II%20Product%20Overview\(Hybrid\).pdf](https://www.karma-group.ru/upload/iblock/a86/OptiX%20OSN%207500%20II%20Product%20Overview(Hybrid).pdf)
- https://support.huawei.com/enterprise/en/doc/EDOC1000178036/84e283e8/fec_uncor_block_cnt
- <https://support.huawei.com/enterprise/my/doc/EDOC1000178036/ee1cd5a6/fec-service-performance-event-list>
- <https://support.huawei.com/enterprise/en/doc/EDOC1000079082?section=j009>
- <https://support.huawei.com/enterprise/en/doc/EDOC1000178036/8c644a29/otn-performance-events>
- https://support.huawei.com/view/contentview!getFileStream.action?mid=SUPE_DOC&viewNid=EDOC1000053910&nid=EDOC1000053910&partNo=j002&type=htm

38. Since at least the date of service of this Complaint, through its actions, Huawei has contributed to the infringement of the '727 Patent by having others sell, offer for sale, or use the Accused Products throughout the United States, including within this judicial district,

with knowledge that the Accused Products infringe the '727 Patent. The Accused Products are especially made or adapted for infringing the '727 Patent and have no substantial non-infringing use. For example, in view of the preceding paragraphs, the Accused Products contain functionality which is material to at least one claim of the '727 Patent.

JURY DEMAND

Brazos hereby demands a jury on all issues so triable.

REQUEST FOR RELIEF

WHEREFORE, Brazos respectfully requests that the Court:

- (A) Enter judgment that Huawei infringes one or more claims of the '727 Patent literally and/or under the doctrine of equivalents;
- (B) Enter judgment that Huawei has induced infringement and continues to induce infringement of one or more claims of the '727 Patent;
- (C) Enter judgment that Huawei has contributed to and continues to contribute to the infringement of one or more claims of the '727 Patent;
- (D) Award Brazos damages, to be paid by Huawei in an amount adequate to compensate Brazos for such damages, together with pre-judgment and post-judgment interest for the infringement by Huawei of the '727 Patent through the date such judgment is entered in accordance with 35 U.S.C. §284, and increase such award by up to three times the amount found or assessed in accordance with 35 U.S.C. §284;
- (E) Declare this case exceptional pursuant to 35 U.S.C. §285; and
- (F) Award Brazos its costs, disbursements, attorneys' fees, and such further and additional relief as is deemed appropriate by this Court.

Dated: June 17, 2020

Respectfully submitted,

/s/ James L. Etheridge

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